

## Report

Thingspeak code snippet:

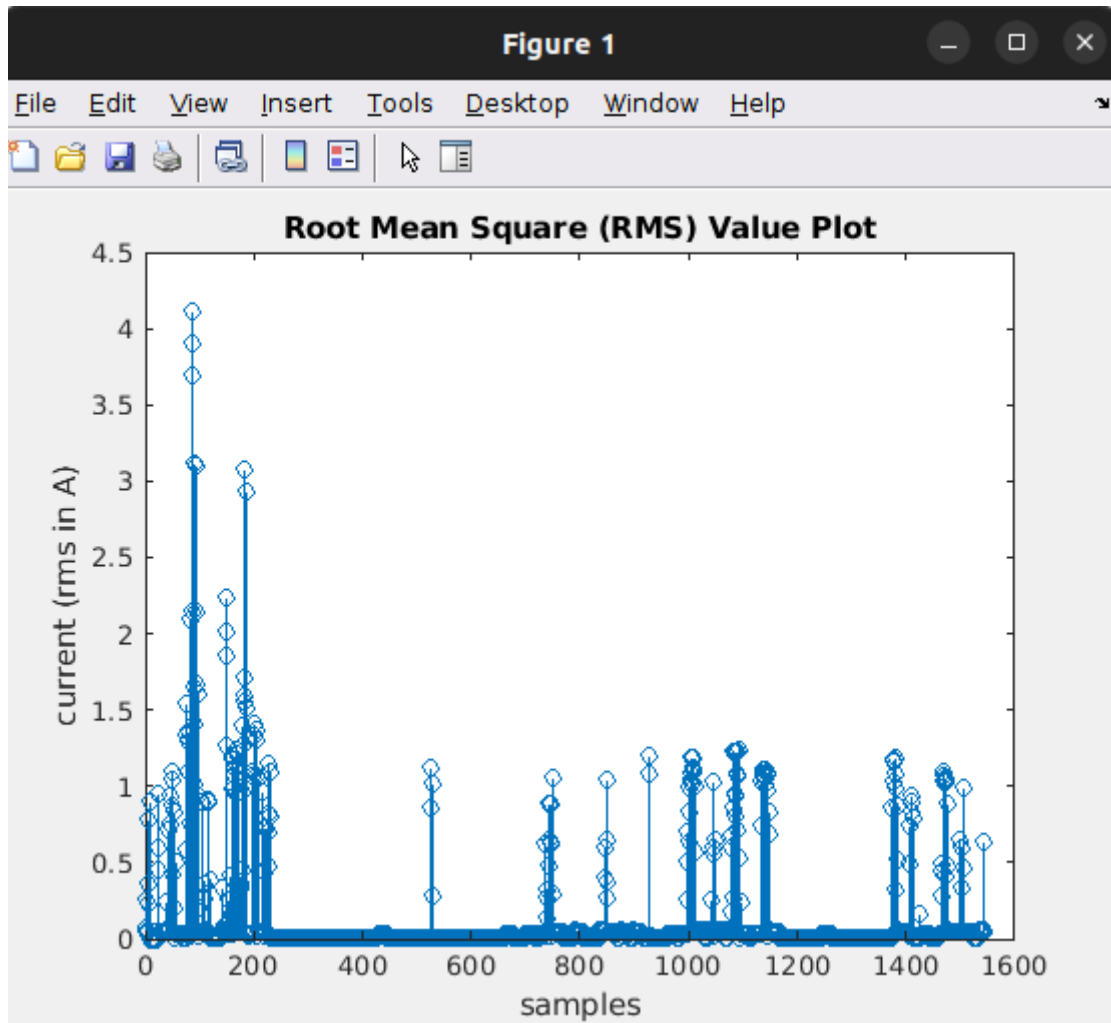
```
adc1 = ads.readADC_Differential_0_1();  
adc2 = ads.readADC_Differential_2_3();
```

```
v1 = ads.computeVolts(adc1);  
v2 = ads.computeVolts(adc2);
```

```
a1 = v1 * 15;  
a2 = v2 * 15;
```

```
Serial.println(a1);  
Serial.println(a2);
```

We don't use RMS values since we sample our data at low frequency and our matlab plot is below:



Aboveplot is plotted from entire data which we collected for **6days**.

## MATLAB CODE:

```
clc, clearvars, close all;
my_csv = readtable('edited.csv');
data = my_csv{:, 5};

window_size = 100;
rms_values = zeros(1, ceil(length(data) / window_size));
for i = 1:window_size:length(data)
    rms_values((i + window_size - 1) / window_size) = rms(data(i:min(i + window_size - 1,
end)));
end

stem(rms_values);
xlabel('samples');
ylabel('current (rms in A)');
title('Root Mean Square (RMS) Value Plot');
```

RMS value allows us to average out and easy to visualize and understand the data

**BUT** since we encountered a hexadecimal error repeatedly, we reached out to other methods. We're also using an extra ADC for better resolution so we used this method to visualize our data.

Using that ADC, we used a differential input so we don't have any negative values since that won't help in our detection.

And hence, we can tell when the washing machine is ON and OFF.

## Observations:

**Wash** lasts longer, but **spin** uses more electricity per second.